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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/905,398	07/14/2001	Nace Layadi	120747/075903.001	3744
29391	7590	04/14/2004	EXAMINER	
BEUSSE BROWNLEE WOLTER MORA & MAIRE, P. A.			MAI, ANH D	
390 NORTH ORANGE AVENUE			ART UNIT	
SUITE 2500			PAPER NUMBER	
ORLANDO, FL 32801			2814	

DATE MAILED: 04/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/905,398	Applicant(s) LAYADI ET AL.	
	Examiner Anh D. Mai	Art Unit 2814	<i>AM</i>

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7 and 19-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7 and 19-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of the Claims

1. Claims 1-5, 7 and 19-21 are pending.

From Previous Office Action

2. Claims 19 and 20 are rejected under 35 U.S.C. 102(e) for anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Brennan (U.S. Patent No. 6,211,072) of record, as previously applied.
3. Claims 1-5, 7 and 21 are rejected under 35 U.S.C. 103(a) for being unpatentable over Yamashita et al., (JP. Patent No. 08-107148) in view of Meikle et al., (U.S. Patent No. 5,231,306) (all of record), as previously applied.

Response to Arguments

4. Applicant's arguments filed January 7, 2004 have been fully considered but they are not persuasive.

Regarding claims 19 and 20

Applicants argue: "Brennan describes layer 28 as an adhesive layer, not a polish stop layer. This is because it has the structure (chemistry) and function of an adhesive layer and not polish stop layer".

Applicants' statement is a conclusion not a fact, since it has been established by the court that the argument of counsel cannot take place of evidence in the record, see *In re Schulze*, 346 F.2 600, 602, 145 USPQ 716, 718 (CCPA 1965).

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Therefore, it is more probable than not the TiCN layer 28 of Brennan is capable of functioning as the etch stop layer as claimed, since, TiCN layer 28 of Brennan is formed of the same material and at the same position as claimed: comprising titanium nitride alloyed with carbon (TiCN) formed over the dielectric layer (20) and extending into the via (24). (See Fig. 5).

Applicants add: "Furthermore, the adhesion layer 28 of Brennan is purposefully removed from the surface of the underlying dielectric layer 20 by a chemical-mechanical polishing process, as illustrated in Figs. 5 and 6".

Note that the limitation of claim 19 further includes: a metal layer disposed over the polish stop layer and filling the via. All of which are clearly taught by Brennan: a metal layer (26) disposed over the polish stop layer (28) and filling the via (24) (see Fig. 5 of Brennan and instant Fig. 1). Therefore, applicants' argument with respect to the mean to remove the layers is irrelevant to the limitation as claimed.

The preponderance of evidence clearly show that the teaching of Brennan anticipates the claimed invention.

With respect to claim 20, Applicants argue: "Brennan describes his adhesion layer 28 as having a carbon content of about 5 atomic percent (column 5, line 39)" then conclude: "It is known that 5 atomic percent is significantly less carbon content than 5 weight percent in this material (i.e. approximately 2 weight percent)".

Applicants fail to support his conclusion by a scientific evidence. It is not known how Applicant come up with his conclusion of 5 atomic percent is approximately 2 weight percent.

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However, the “weight” of a chemical formula is known as “atomic weight”. In the instant case, the atomic weight of TiCN or titanium nitride alloyed with carbon is 230 (Ti + N + C where Ti = 204; N = 14 and C = 12, see Periodic Table of the Elements). Therefore, the weight percent of carbon is $(12 / 230) \times 100 = 5.22$ weight percent, which is within the claimed range (5 to 20 percent by weight).

The rejection of claims 19 and 20 is therefore, maintained.

Regarding claims 1-5 and 21

Applicants state: “The Examiner takes the position that the teaching of Meikle would make it obvious to replace the TiN of Yamashita with TiAlN. The applicants find the Examiner's position to be without support in fact” and admit that “Meikle does state that TiAlN can replace TiN in many of its uses in semiconductor devices”.

Applicants admission that “Meikle does teach that TiAlN can replace TiN in many of its uses in semiconductor devices” is the supporting fact that Examiner has relied upon for the obviousness.

Since it is well known that TiN has been used as a polish stop layer, then replacing TiN, and having numerous advantages over TiN, TiAlN should be obviously used as a polish stop as well.

By the teaching that TiAlN can replace TiN in many of its uses in semiconductor devices, it is more probable than not TiAlN is capable of function as a polish stop layer.

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In response to applicant's argument that "Meikle does not suggest that TiAlN can replace TiN in all of its uses", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

A mere argument that the references can not be combine does not mean that the claim is unobvious over the teaching of the cited arts.

With respect to claim 21, Applicants state: "Yamashita recognizes that TiN is removed by etching" and conclude: "thus teaches away from using TiN as an etch stop layer".

Note that removing TiN by etching has nothing to do with TiN being an etch stop layer. Everything under the sun can be etch by something. If TiN or TiAlN or TiCN can not be etch by anything, there is no used for these materials in semiconductor, because they can not be patterned.

The preponderance of evidence has shown that claims 1-5 and 21 are obvious over the teaching of the references.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A.M
April 6, 2004



LONG PHAM
PRIMARY EXAMINER